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Biosynthetic potential for polyketides in *Talaromyces atrovirens*

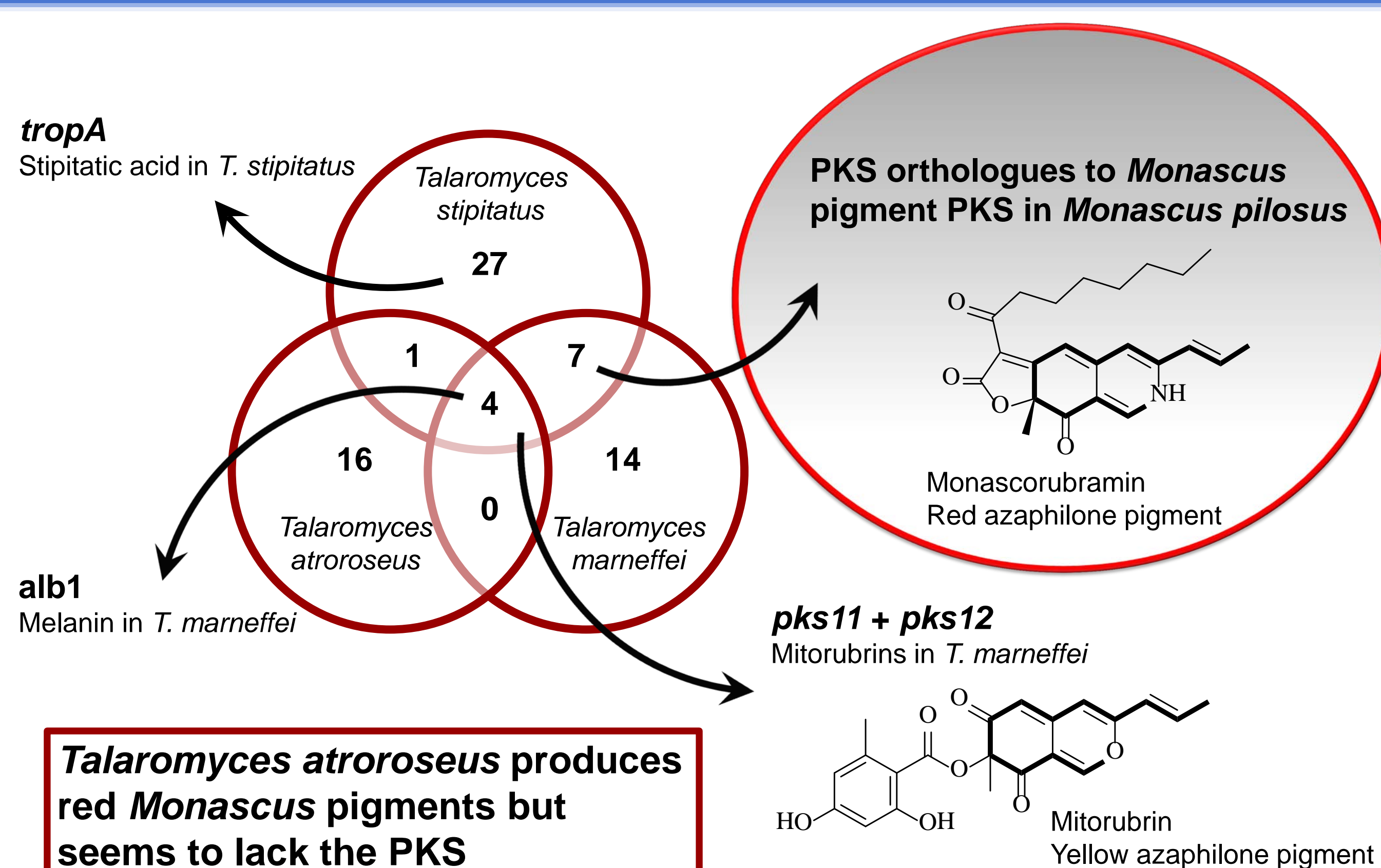
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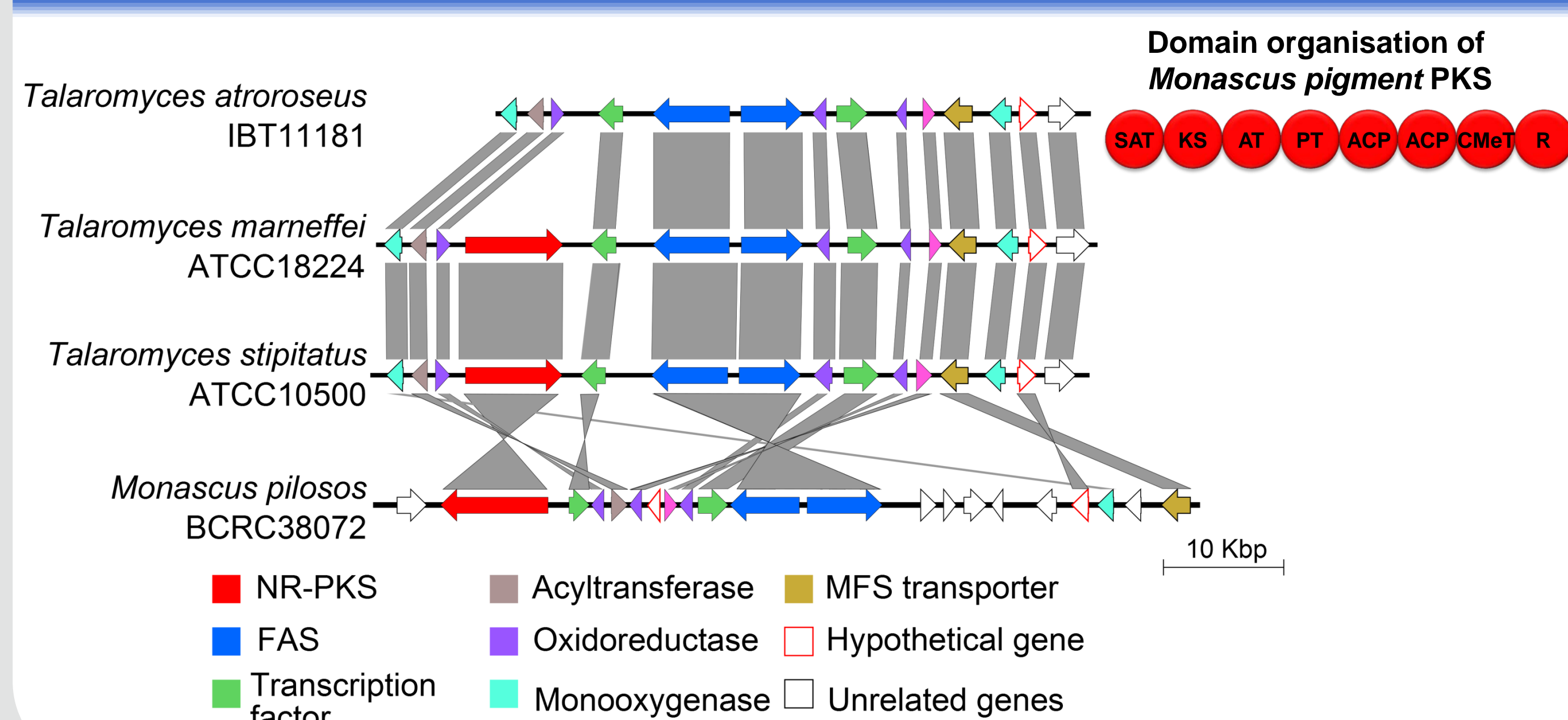
Abstract

Talaromyces atrovirens is an efficient producer of red *Monascus* pigments. We genome sequenced *Talaromyces atrovirens* IBT11181 and found it to lack the *Monascus* pigment PKS with the rest of the *Monascus* pigment cluster intact. The PKS closest related to the *Monascus* pigment PKS is the mitorubrin PKS11, and deletion of PKS11 results in the loss of *Monascus* pigment production. *T. atrovirens* PKS11 is delivering a precursor for both the mitorubrins and the *Monascus* pigments. Based on this finding we propose hypothetical models for the evolution of azaphilone pigment PKS clusters in *Talaromyces* and *Monascus*.

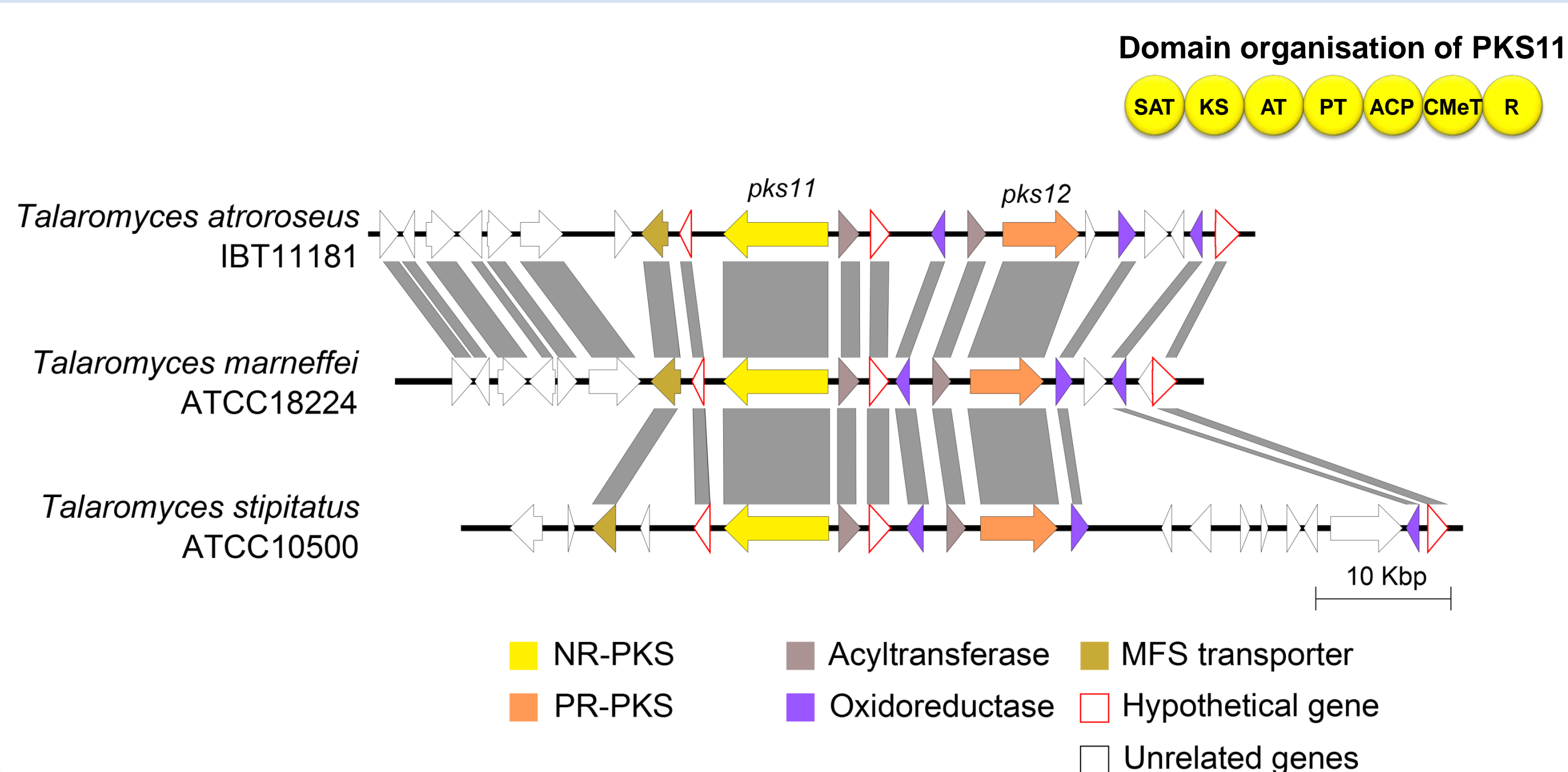
1. Polyketide synthases in genome sequenced *Talaromyces*



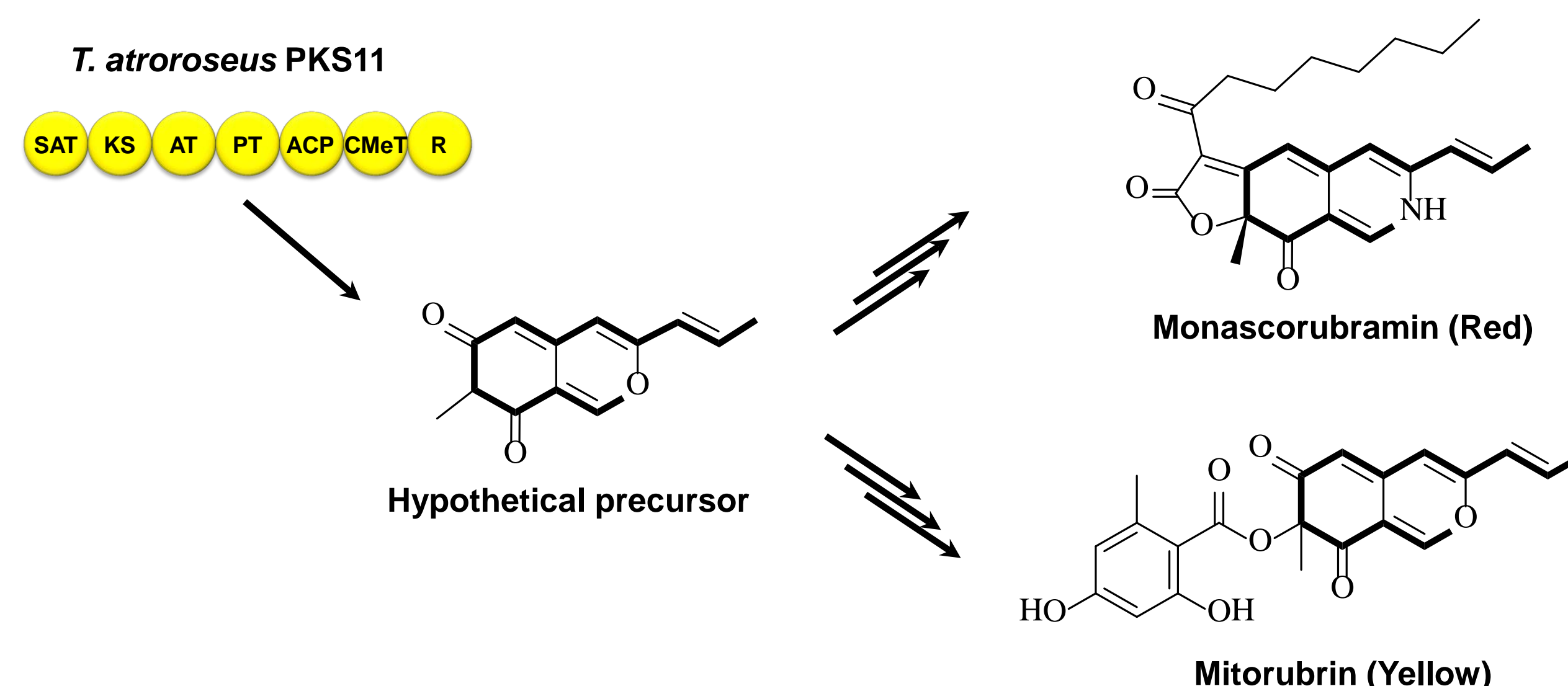
2. Synteny of *Monascus* pigment cluster *T. atrovirens* lacks the *Monascus* pigment PKS



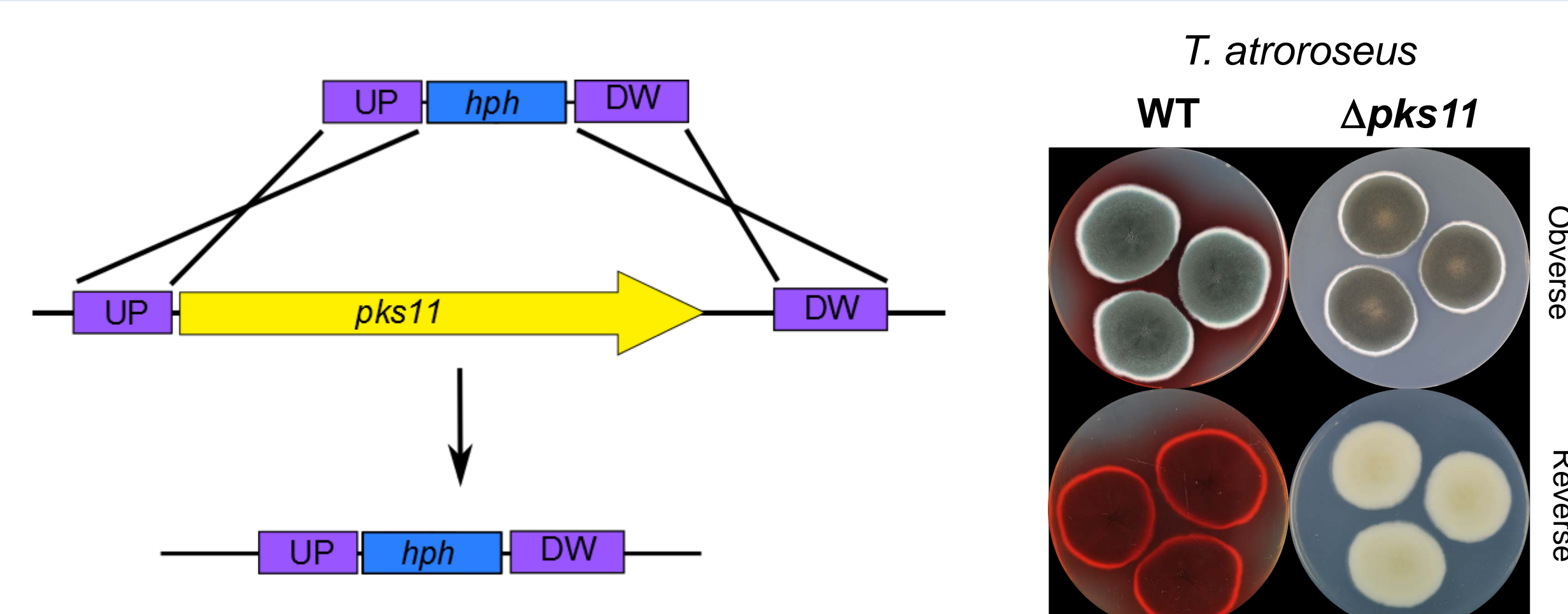
3. Synteny of mitorubrin cluster Cluster with PKS closest related to *Monascus* pigment PKS



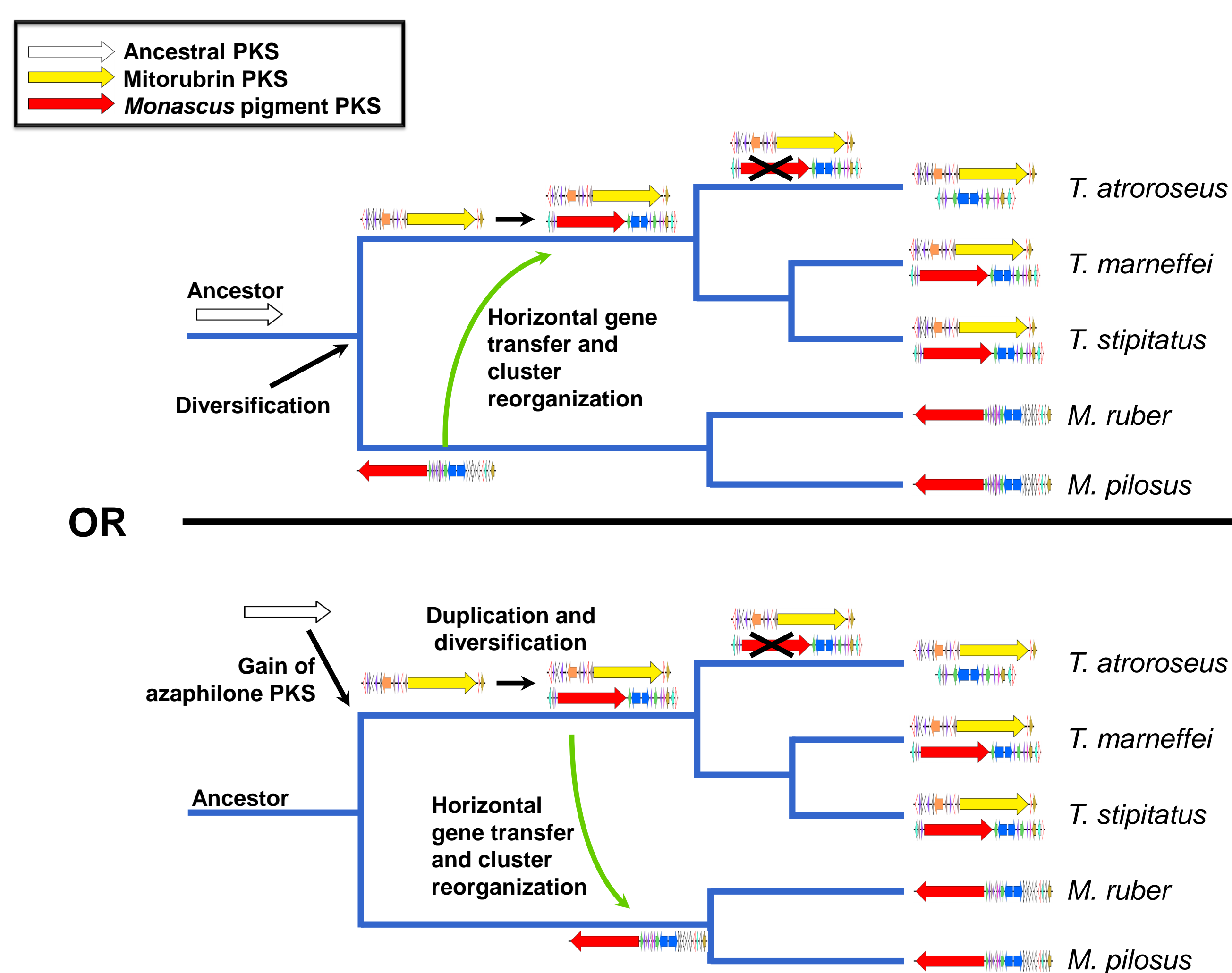
4. *T. atrovirens* PKS11 delivers precursor for both *Monascus* pigments and mitorubrins



5. Deletion of *pks11* in *T. atrovirens* results in loss of production of red *Monascus* pigments



6. Hypothetical evolution of azaphilone PKS clusters in *Talaromyces* and *Monascus*



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We thank Simon Rasmussen, Bent Petersen and Thomas Sicheritz-Pontén, Center for Biological Sequence analysis, DTU Systems Biology, for assembling the genome of *T. atrovirens*.
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